



# Team Exercises

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***AIRS Team Exercise***



## Objectives for Team Exercise 1/22 - 1/26/01



### A. Processing Verification

- Infrared RTA Implementation
- Flow Control
- Channel Properties File
  - Review and revise channel properties list following Science Team Meeting
- Tuning/Angle Corrections
  - New predictor required for Tuning.
- Channel Selection
- Climatological Bound Testing
  - Use AVN forecast to provide first order evaluation with real data
- Regression Coefficient Testing



## Objectives for Team Exercise 1/22 - 1/26/01



- B. Product Verification
  - Temperature product
  - Humidity product
  - Cloud product
  - Surface product
  - Q/A parameter verification
  - Cloud-cleared radiance verification
  - Visible cloud flag
  - Visible diagnostics





## Objectives for Team Exercise 1/22 - 1/26/01



### C. File Verification

- Level 2 Standard product
- Level 2 Support product
- Browse product
- Cloud-cleared Radiance product





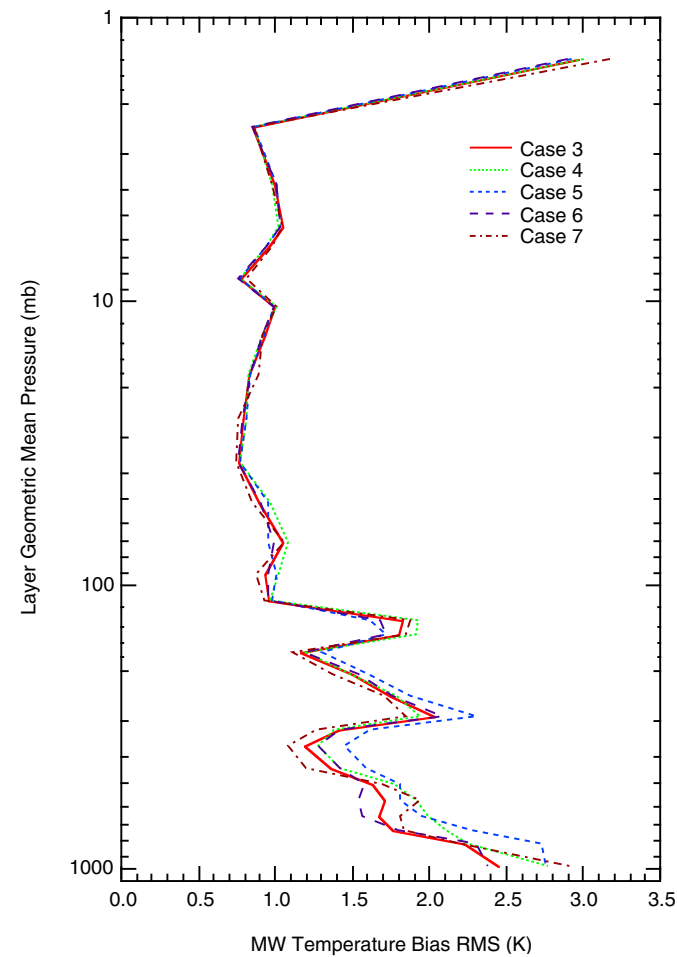
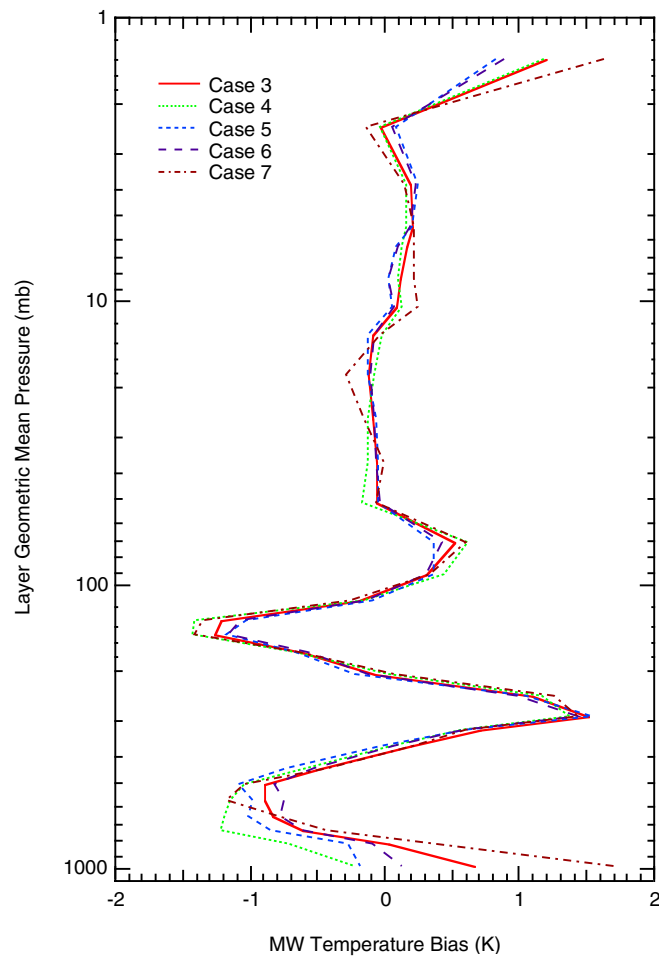
## Sherlock Holmes Stuff



3	Retrieval_type = 0	FINAL IR	All retrieval stages successful
4	Retrieval_type = 20	MWSIR	MW and FIRST successful, FINAL falls back to MW & Strat IR
5	Retrieval_type = 30	MWSIR	MW successful, FIRST unsuccessful, FINAL falls back to MW & Strat IR
6	Retrieval_type = 10	FINAL IR	MW successful, FIRST unsuccessful, FINALsuccessful
7	Retrieval_type = 0 Truth: clear_flag = 1	FINAL IR	All stages successful for TRUTH CLEAR FOVs



# Microwave-Only Temperature Retrieval

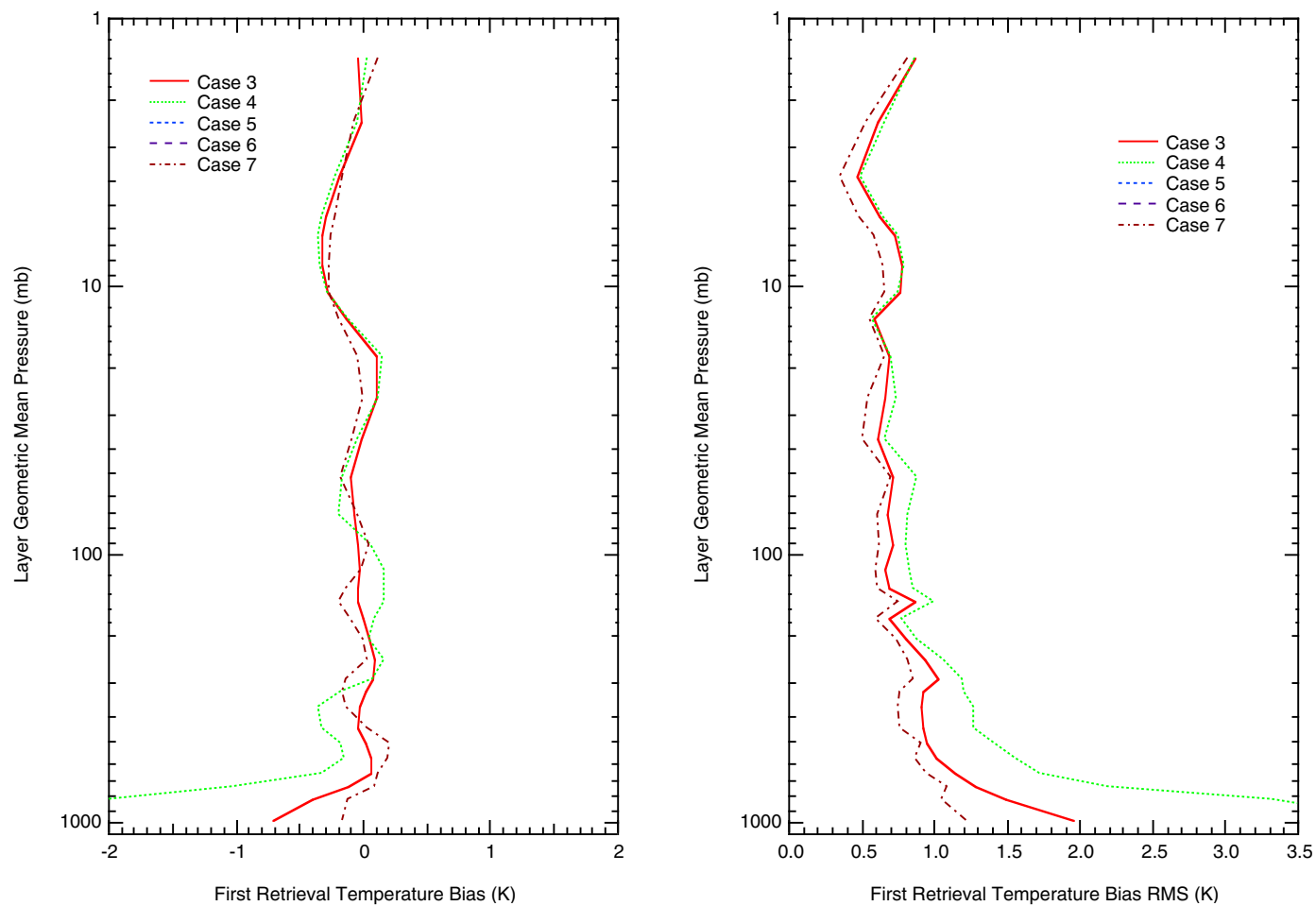


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# FIRST TEMPERATURE RETRIEVAL

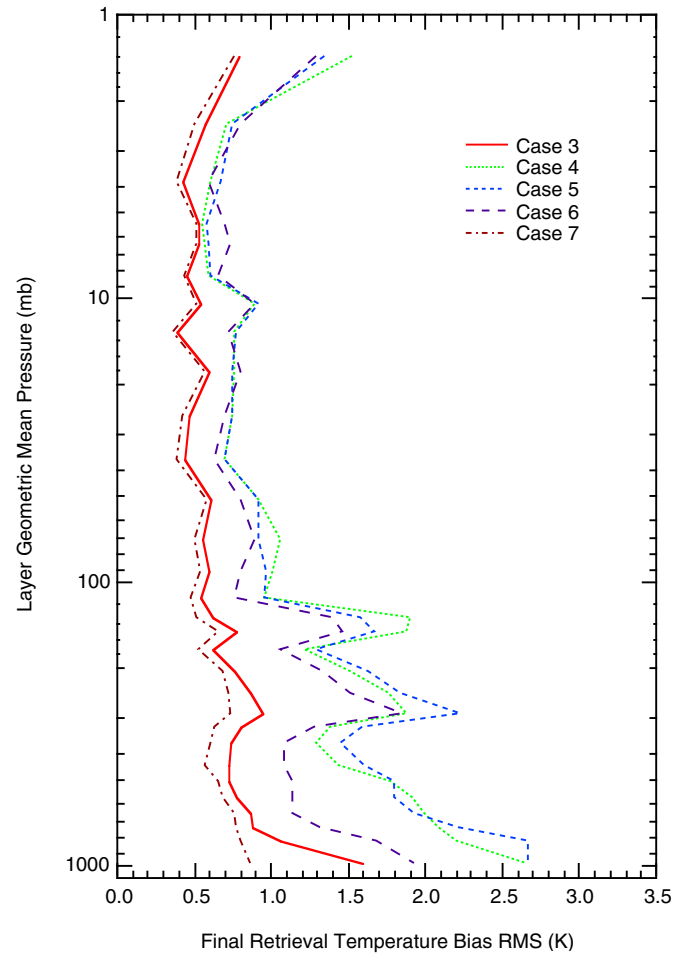
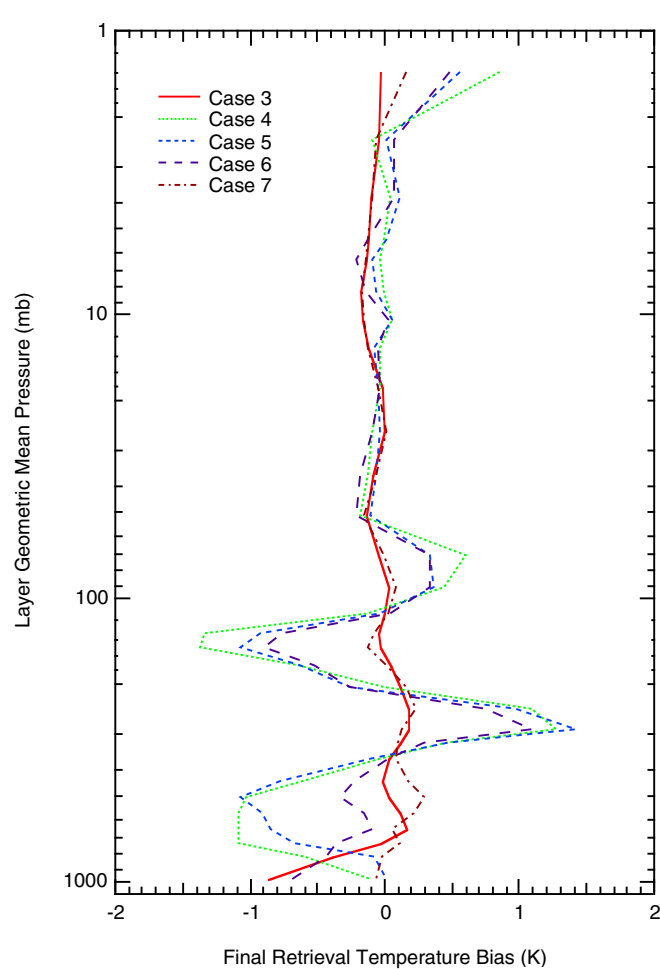


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# FINAL TEMPERATURE RETRIEVAL



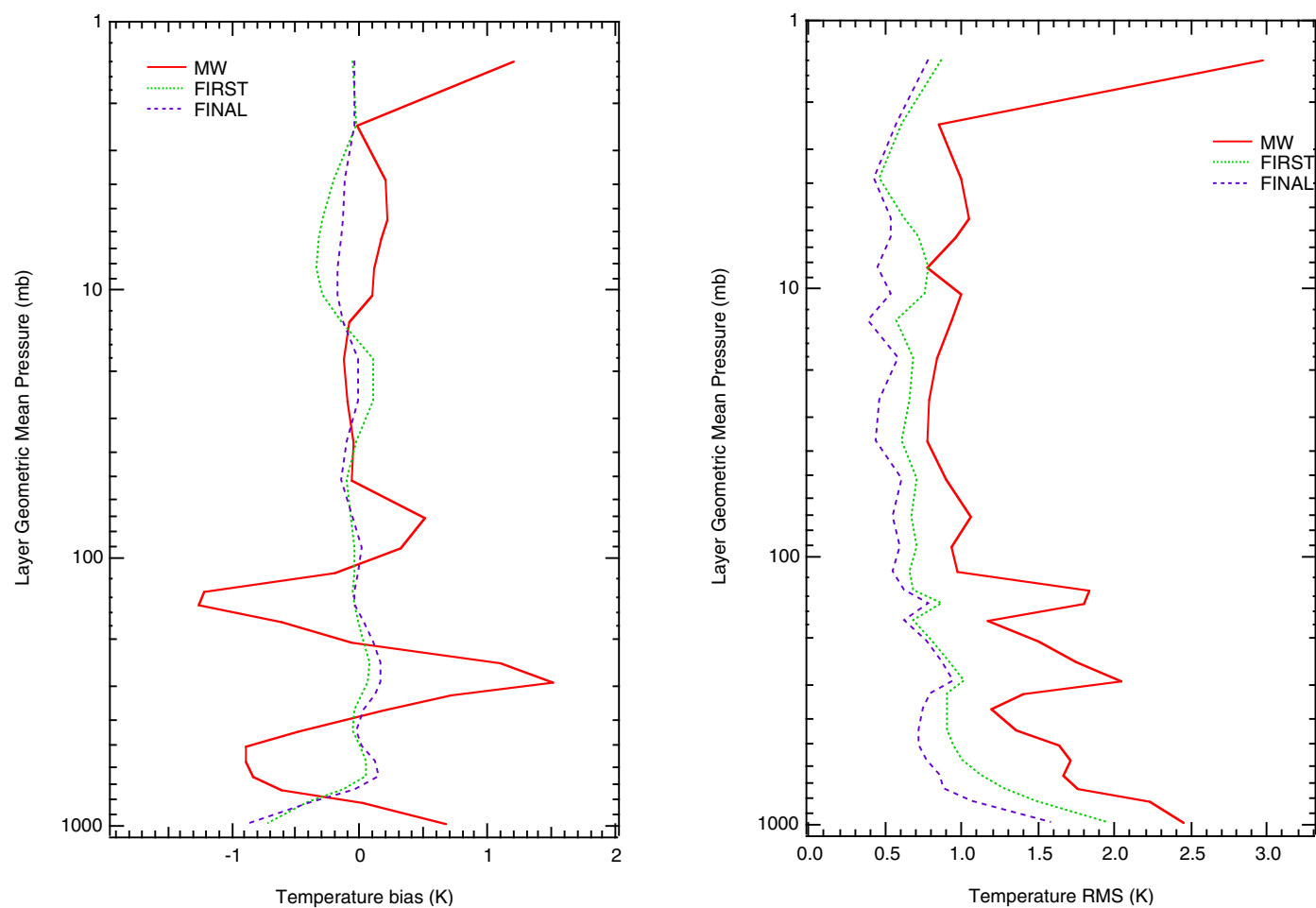
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## CASE 3 TEMPERATURE RETRIEVAL

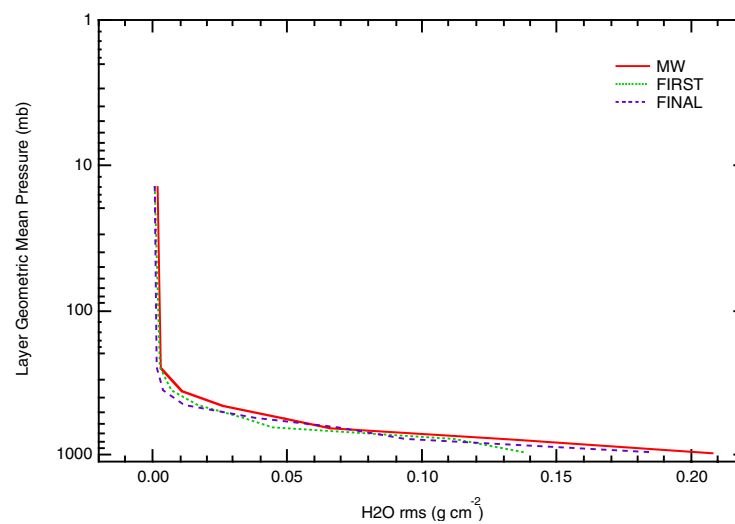
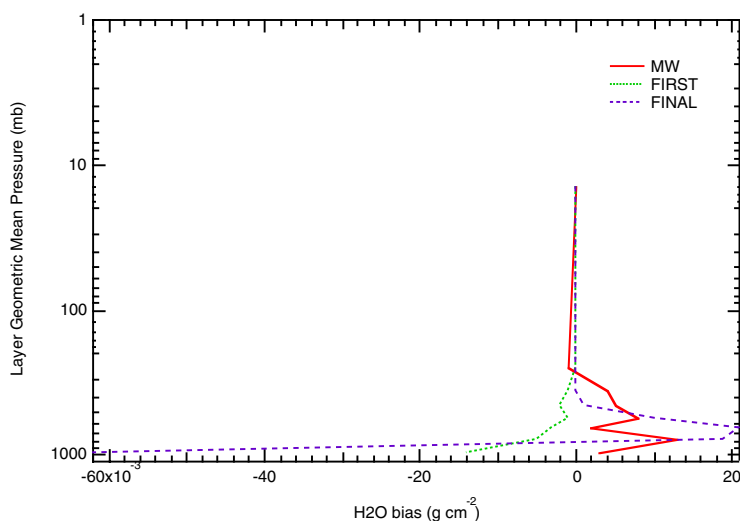


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# WATER VAPOR RETRIEVAL

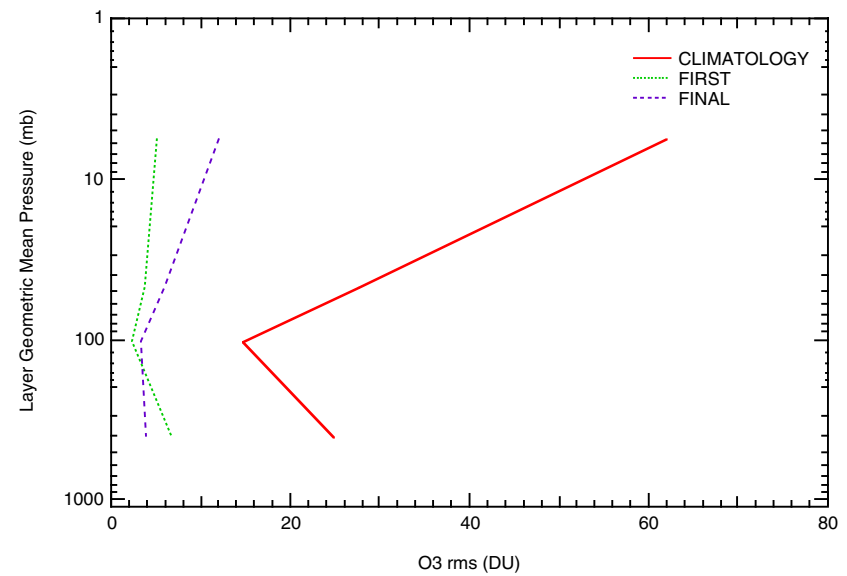
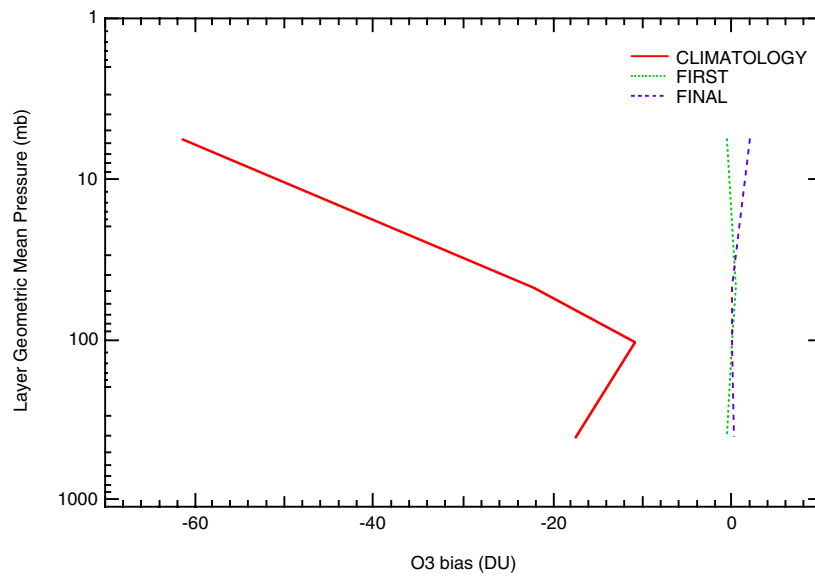


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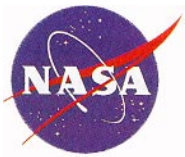


# OZONE RETRIEVAL

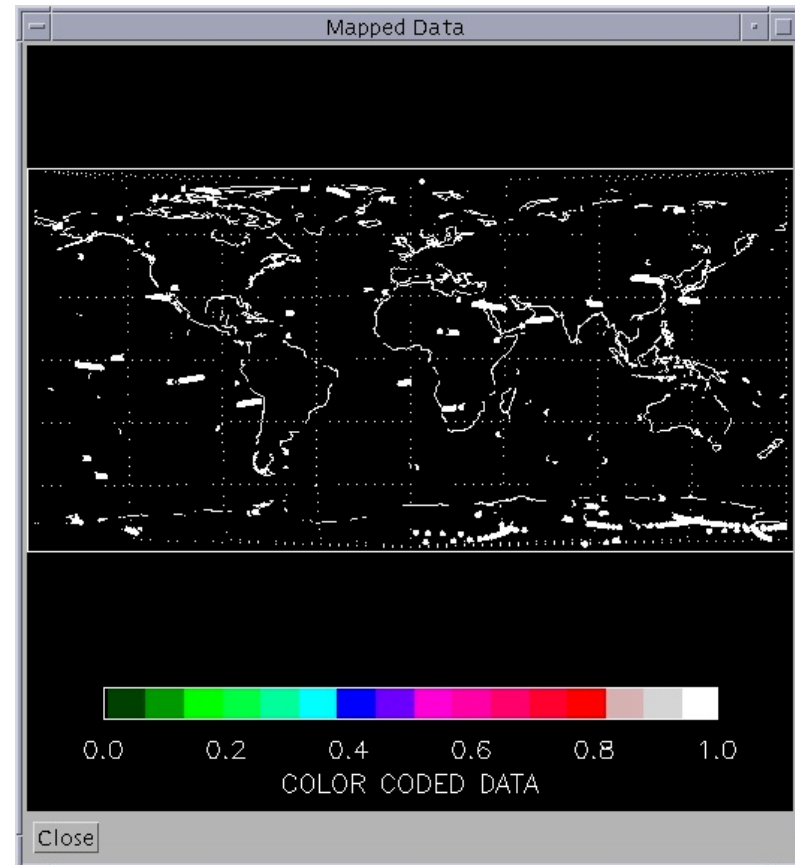
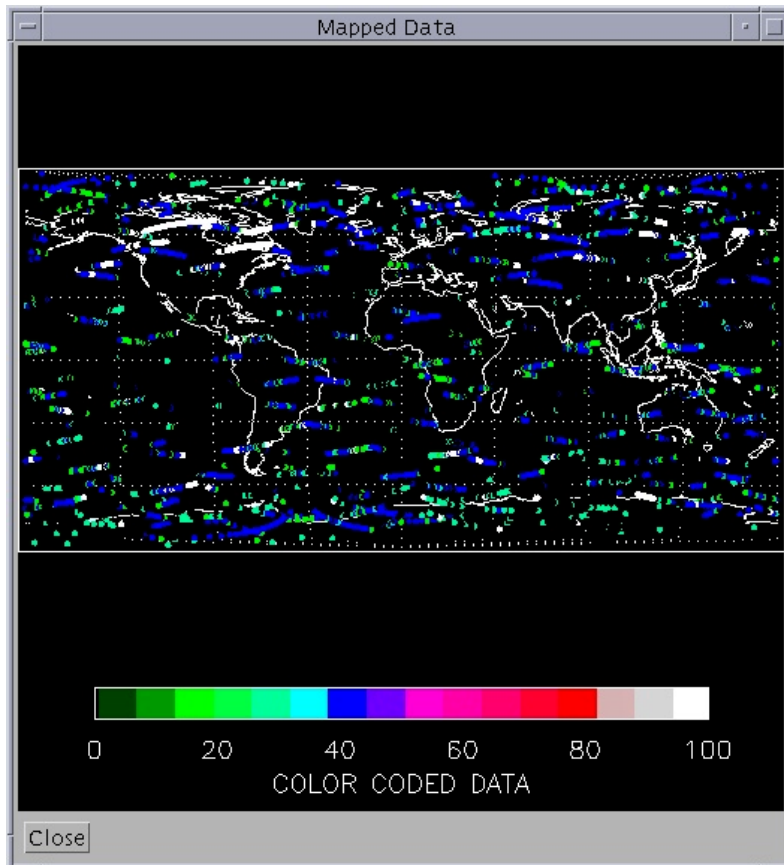


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## Granule-401 FOV Distribution Retrieval Type and Truth Clear Flag

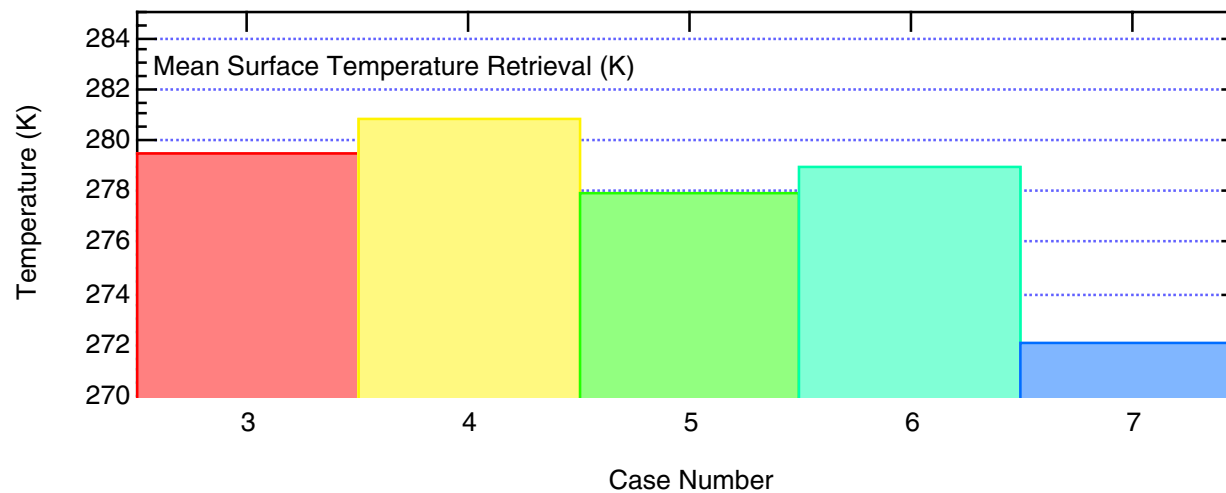


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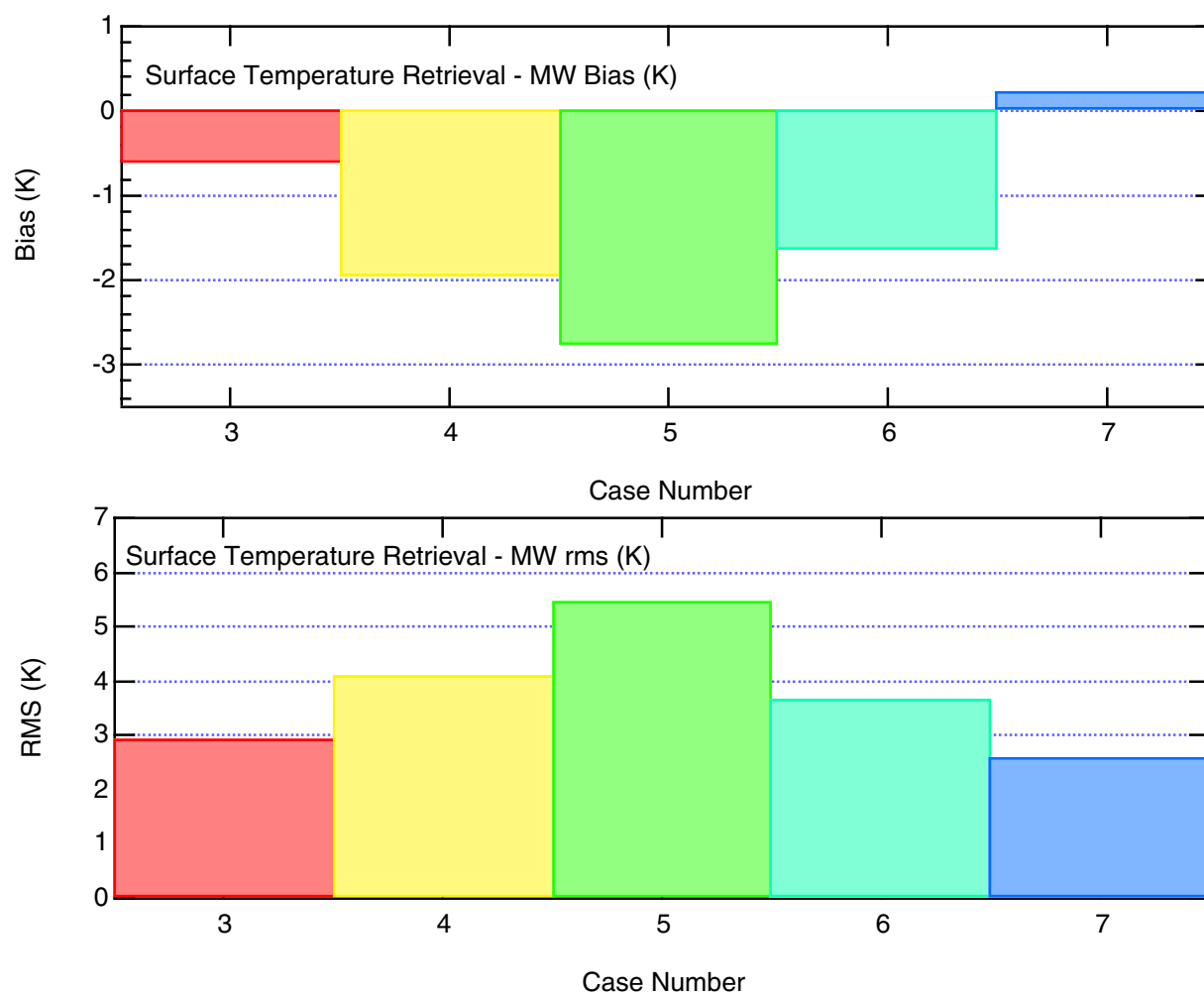


# SURFACE TEMPERATURE RETRIEVAL





## MW T<sub>surf</sub> RETRIEVAL

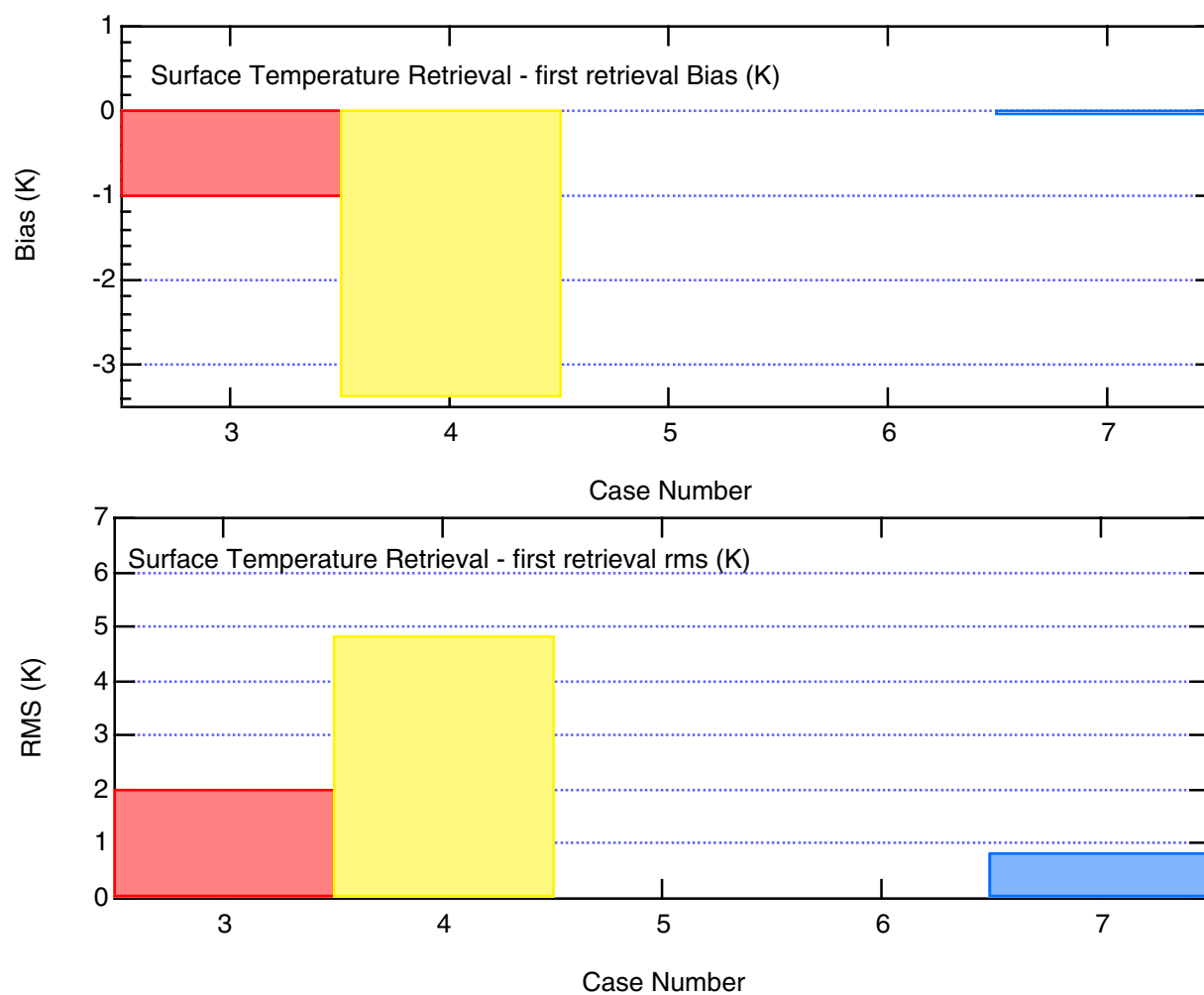


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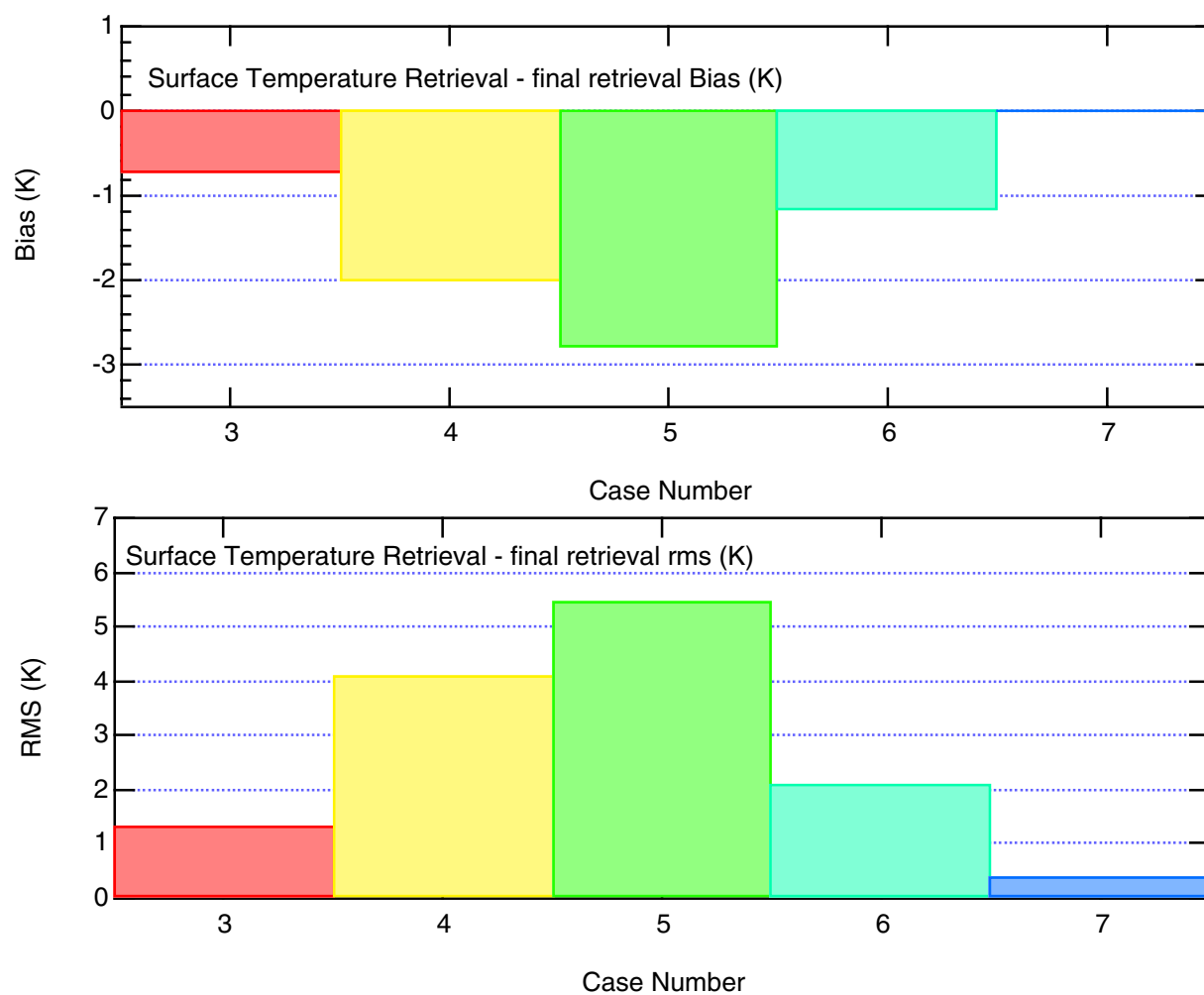


## FIRST T<sub>surf</sub> RETRIEVAL





## FINAL T<sub>surf</sub> RETRIEVAL



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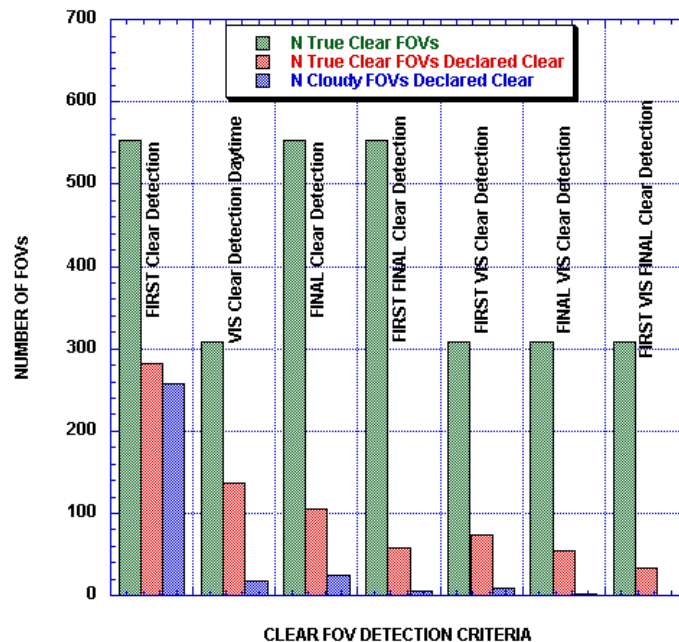
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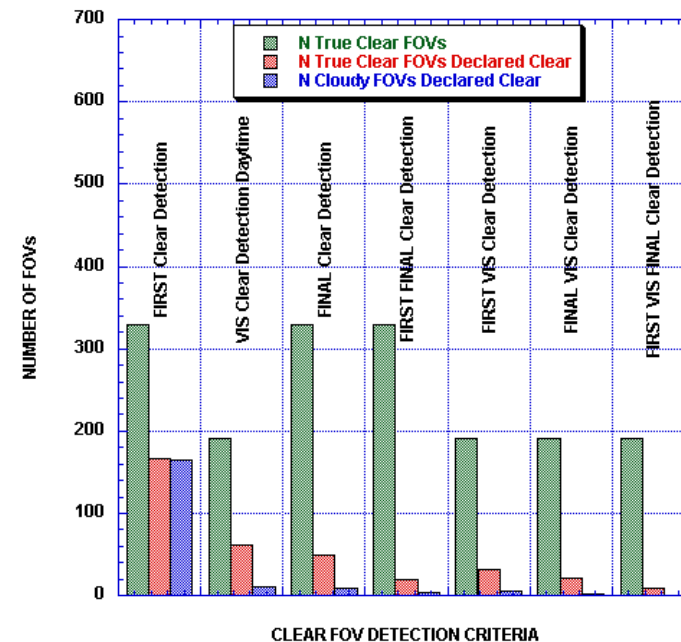


# Comparison of Clear FOV Detection

Granule-401 Clear FOV Detection Statistics  
February 12, 2001 Simulation  
-90° < Lat < +90°  
(NOAA swir-lwir threshold = 6)



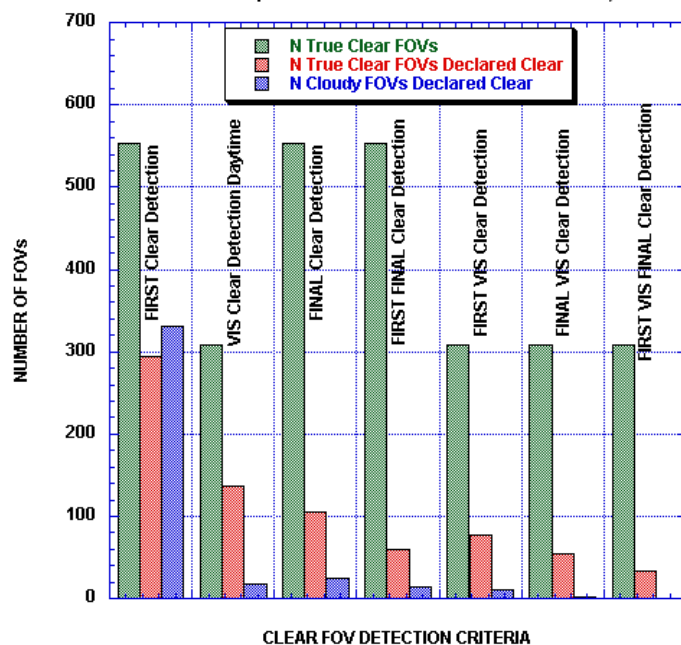
Granule-401 Clear FOV Detection Statistics  
February 12, 2001 Simulation  
-60° < Lat < +60°  
(NOAA swir-lwir threshold = 6)



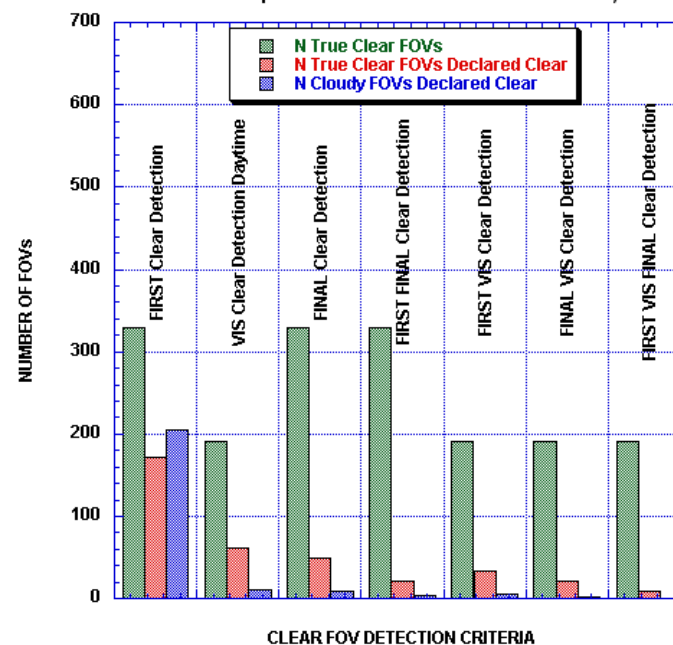


# Comparison of Clear FOV Detection

Granule-401 Clear FOV Detection Statistics  
February 12, 2001 Simulation  
-90° < Lat < +90°  
(NOAA swir-lwir threshold = 7  
NOAA spatial coherence threshold = 0.0026)



Granule-401 Clear FOV Detection Statistics  
February 12, 2001 Simulation  
-60° < Lat < +60°  
(NOAA swir-lwir threshold = 7  
NOAA spatial coherence threshold = 0.0026)

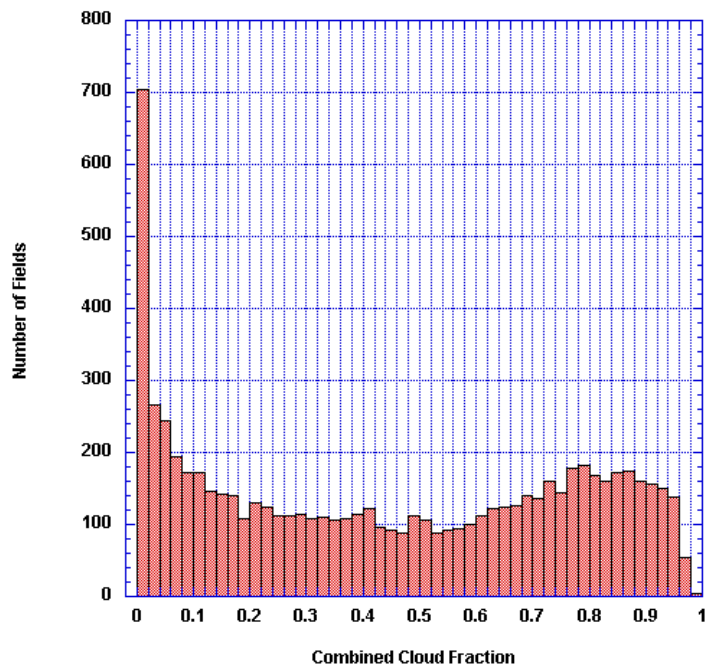




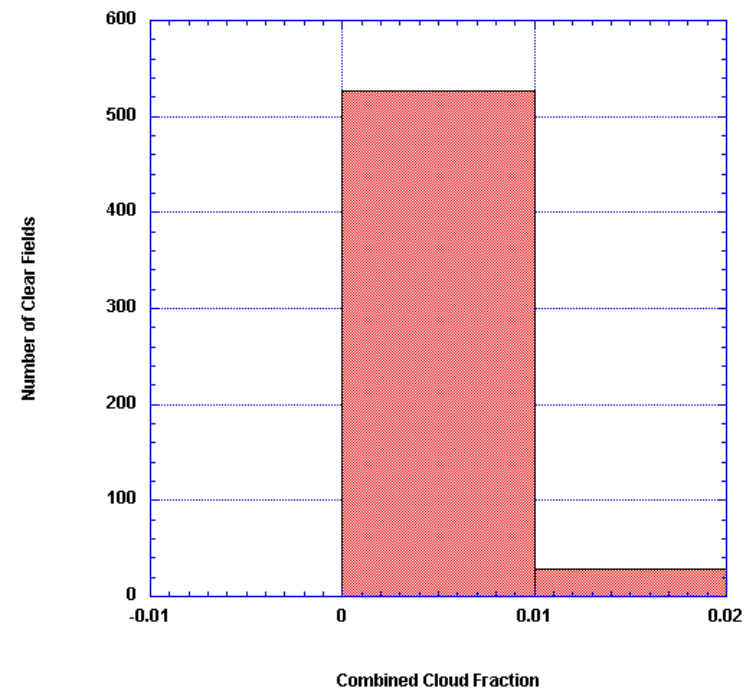
## Distribution of Combined Cloud Fraction



Granule-401 Distribution of Combined Cloud Fraction  
Feb 12 Simulation of 20001215  
(combined = upper + lower)



Granule-401 Distribution of Cloud Fraction  
For TRUE Clear FOV  
Feb 12 Simulation of 20001215  
(combined = upper + lower)

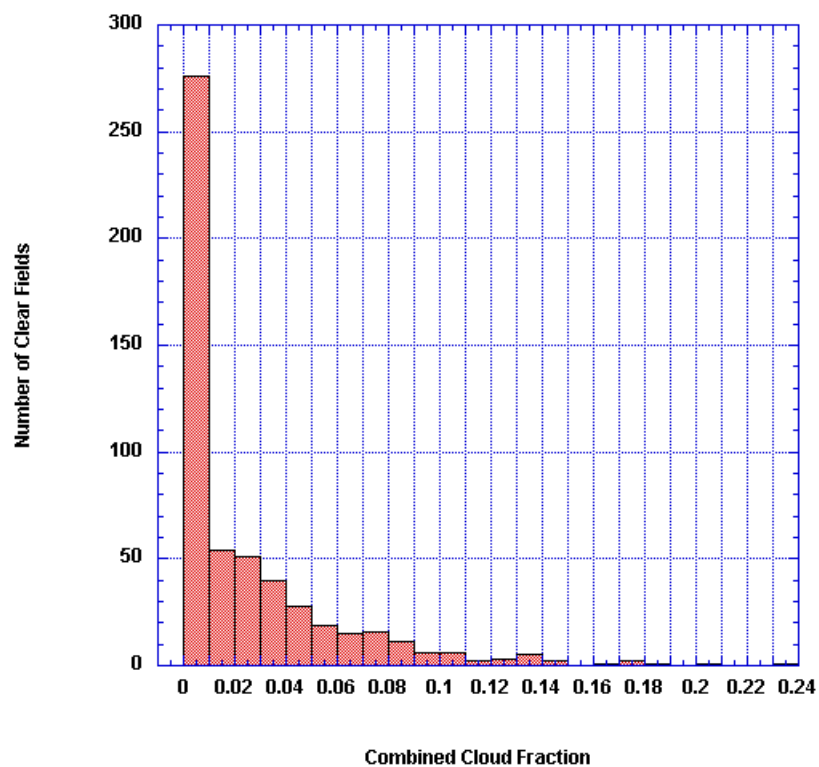




# INITIAL Clear FOV Detection Cloud Fraction



Granule-401 Distribution of Cloud Fraction  
For INITIAL Clear FOV Detections  
Feb 12 Simulation of 20001215  
(combined = upper + lower)



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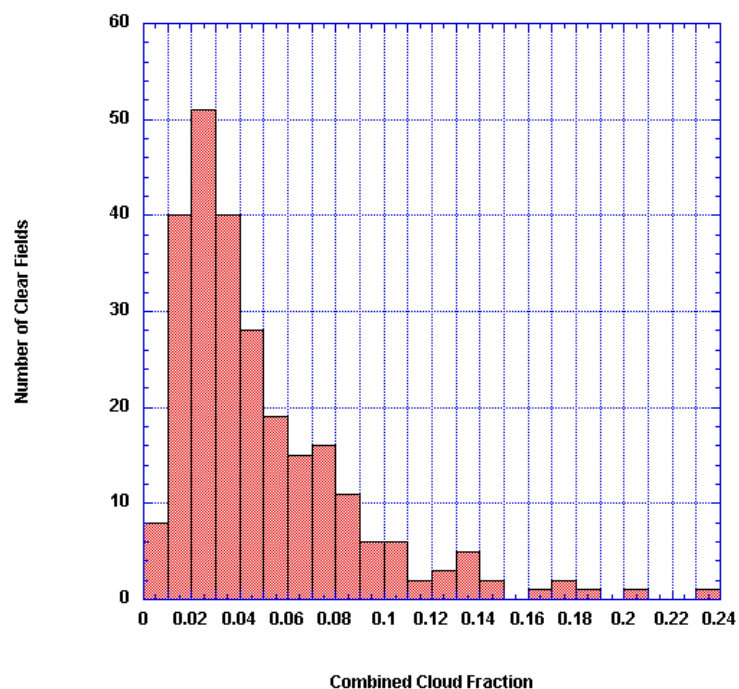
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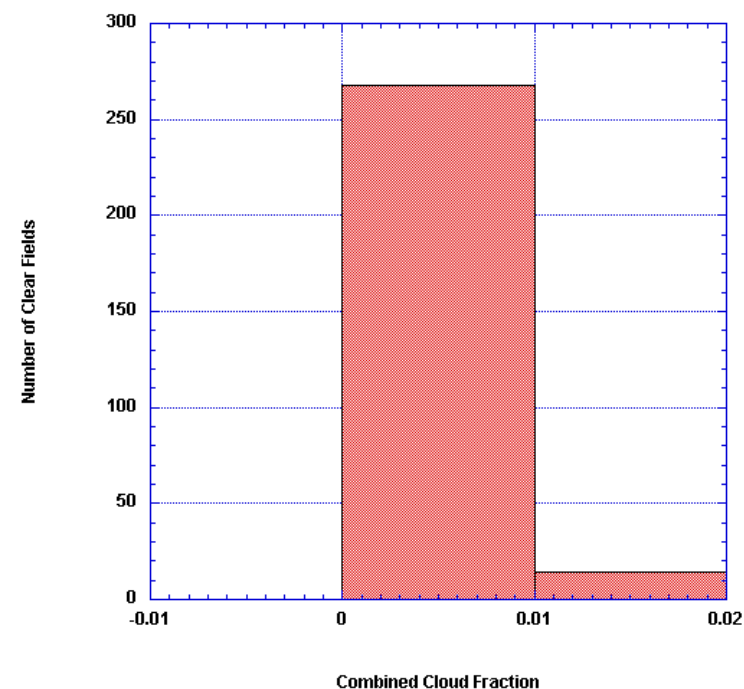
# INITIAL False and True Clear FOV Detection Cloud Fractions



Granule-401 Distribution of Cloud Fraction  
For INITIAL False Clear FOV Detections  
Feb 12 Simulation of 20001215  
(combined = upper + lower)



Granule-401 Distribution of Cloud Fraction  
For INITIAL True Clear FOV Detections  
Feb 12 Simulation of 20001215  
(combined = upper + lower)

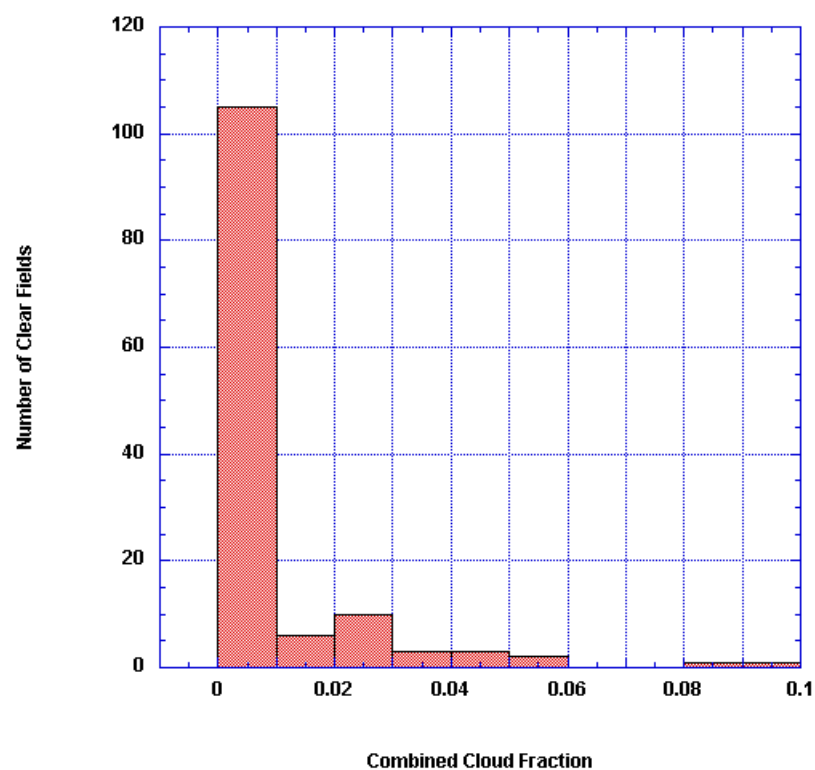




# FINAL Clear FOV Detection Cloud Fraction



Granule-401 Distribution of Cloud Fraction  
For FINAL Clear FOV Detections  
Feb 12 Simulation of 20001215  
(combined = upper + lower)

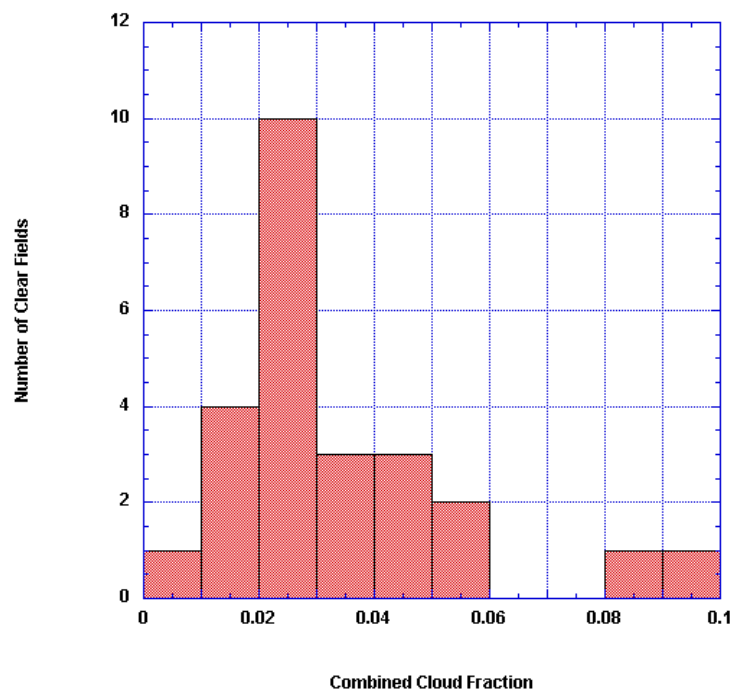




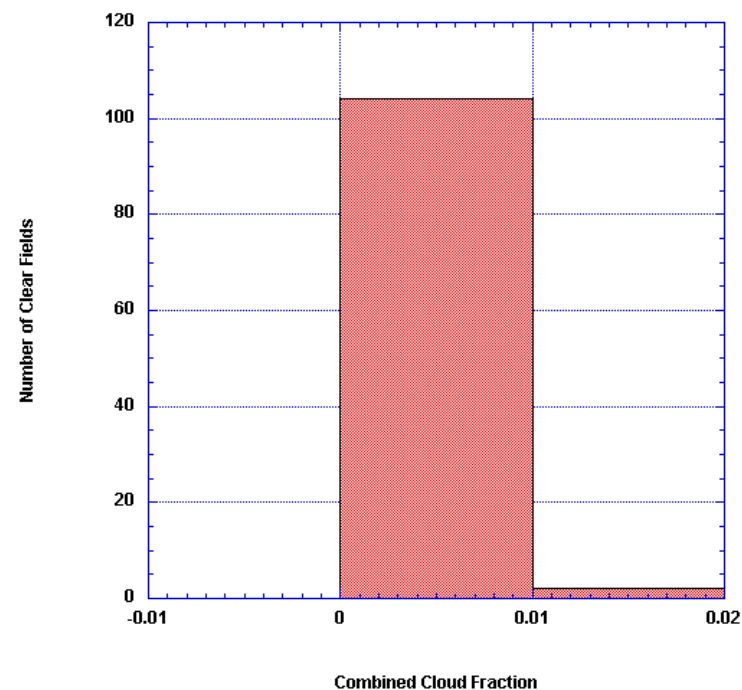
# FINAL False and True Clear FOV Detection Cloud Fractions



Granule-401 Distribution of Cloud Fraction  
For FINAL False Clear FOV Detections  
Feb 12 Simulation of 20001215  
(combined = upper + lower)



Granule-401 Distribution of Cloud Fraction  
For FINAL True Clear FOV Detections  
Feb 12 Simulation of 20001215  
(combined = upper + lower)



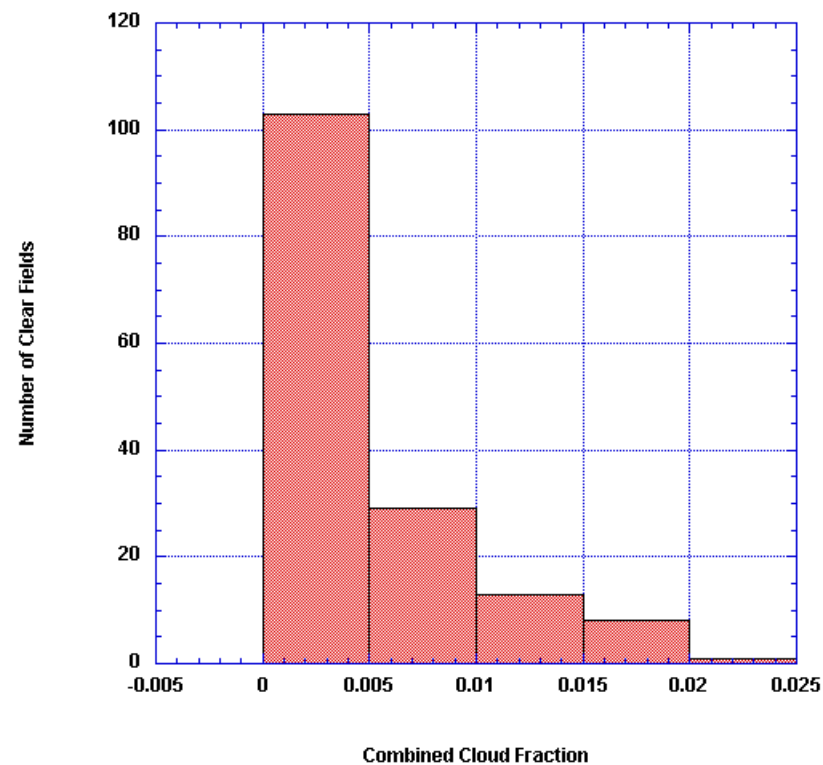




# VIS Clear FOV Detection Cloud Fraction



Granule-401 Distribution of Cloud Fraction  
For VIS Clear FOV Detections  
Feb 12 Simulation of 20001215  
(combined = upper + lower)



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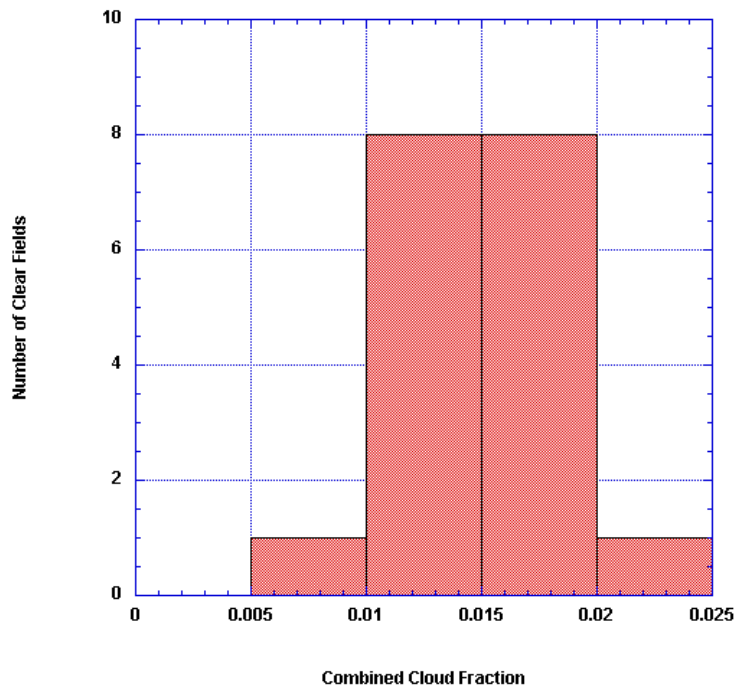




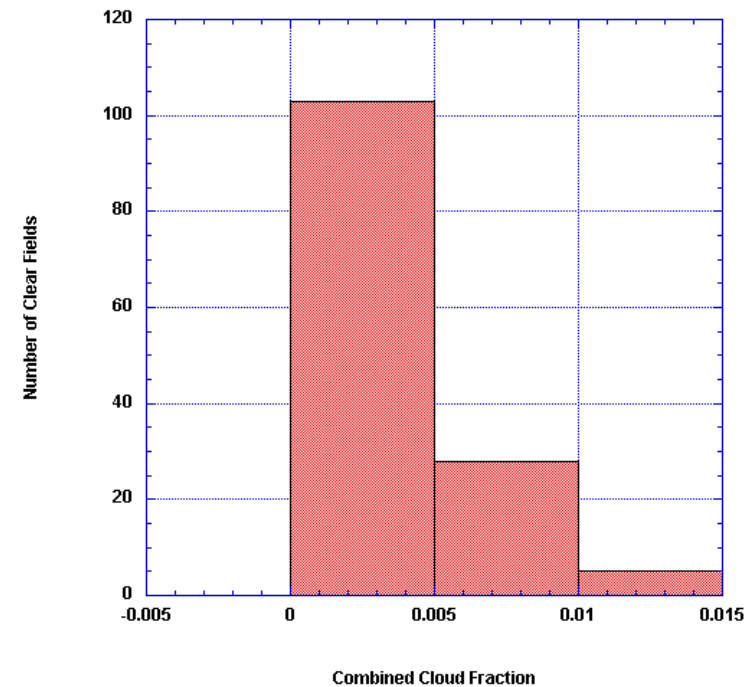
# VIS False and True Clear FOV Detection Cloud Fractions



Granule-401 Distribution of Cloud Fraction  
For VIS False Clear FOV Detections  
Feb 12 Simulation of 20001215  
(combined = upper + lower)



Granule-401 Distribution of Cloud Fraction  
For VIS True Clear FOV Detections  
Feb 12 Simulation of 20001215  
(combined = upper + lower)





## General Conclusions



- ***Core algorithm in place and working at V2.1.5 !***
- Characteristics of the retrievals are not significantly changed from previous simulations and Team Exercises
  - Cold bias still present
    - GSFC test code and L2\_PGE have the same pathology of biases and rms errors
    - 8 track set behaves better than the current simulations
      - Sampling difference
      - Rejection criteria refinement
- Only major new capabilities needed in L2\_PGE is to put in place simple flow control - *V2.1.5 need not change for some time*
- Are the current simulations and 8-track set are not suitable for closure testing?
  - To many uncertainties in their provenance



## More General Conclusions



- Changing the characteristics of the instrument performance (e.g.,  $\text{Ne}\Delta T$ ) highlighted the sensitivity of the results to threshold settings by changing yields and ultimately the gross statistics of the retrievals BUT not the quality
- Clear sky detection
  - Yield and reliability seem to be mutually exclusive
  - Simple clouds but are they too complex?
  - Do we need a new pre-L2\_PGE processor to always be run
    - Run clear sky detection
    - Cloud-clearing on some near-clear observations



## On the use of simulations



- Global simulations with the AVN forecast are useful in training and debugging the retrieval system
- Global simulations with the AVN forecast create a smooth world with limited variability
  - Variability has to be forced upon the simulation
  - The subset granules 401, 411, and 421 are very representative of all the granules - will this be true for real data?



## Future Team Exercises



**JPL**

- TDS data access and storage
  - Given how few files we are focusing on, this may not be critical to the Science Team (yet)
  - Delivery in May will contain critical capabilities for routine ingest and for data production
- Limited truth
  - Matchups to RaObs, ARM/CART site data, sea surface data
- L1b -> L1a simulation
- Off-nominal instrument performance issues
- Cloud properties and simulation variability
  - Transmissive clouds particularly cirrus
  - Cloud variability
- Aerosols

# 1

# 2



## Schedule



- Next Two Exercises
  - May 28 - June 1, 2001 will focus on sparse truth validation based on a simulation with one AVN forecast and a later AVN forecast used for “truth” statistics generation (Gstats files) with radiance biases
  - If launch is delayed THEN later in October will upgrade the simulation system to include grey clouds, variability etc.